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Persistent juvenile T-wave pattern

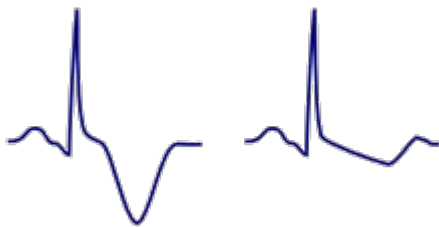
Juvenile T wave inversion, Persistent juvenile T wave

- [Normal T Wave](#)
- [ECG and Persistent Juvenile T Waves](#)
- [Differential Diagnosis](#)

Normal T Wave



Concordant T Wave



Disconcordant T Wave

- The T wave is the **most variable wave on the ECG**

- Represents **ventricular repolarization**
- Is **low and wide**
- Is **concordant** (has the same polarity as the QRS)
 - Positive QRS - positive T wave
 - Negative QRS - negative T wave
- Is **positive (I, II, V3-V6)**
 - Can be isolated negative (III, aVL)
- Is **negative (aVR)**
- **Amplitude**
 - In **limb leads** < 5mm
 - In **chest leads** < 15mm
- For **ECG diagnostics**, the **dynamic nature of the T wave** is important
 - If the **T wave is consistently the same** - it often **does not indicate a serious condition**
 - If the **T wave changes** - it often indicates a **serious condition** (**ischemia**)

ECG and Persistent Juvenile T Waves



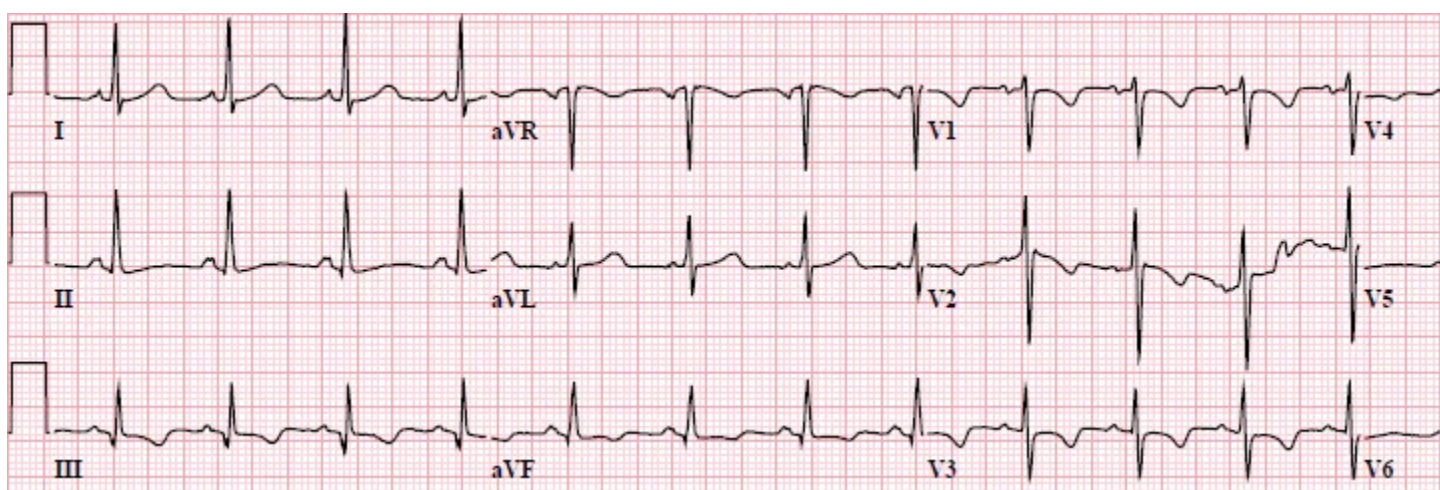
- Occur primarily in **African-American women** under **30 years old**
 - Present **from childhood** and persist **into adulthood (do not change)**
- **Likely** caused by **hemodynamic right ventricular overload**
 - during **intrauterine development**
- **Common** in **athletes**
- Patients **do not have structural heart damage**

- **ECG and Persistent Juvenile T Waves**

- Seen in leads **V1-V3**
 - In children under 12 years, they can also be present in **V4**
- Are **asymmetric inverted T waves**
- Are **deep < 3mm** (most common, but not a rule)

Differential Diagnosis

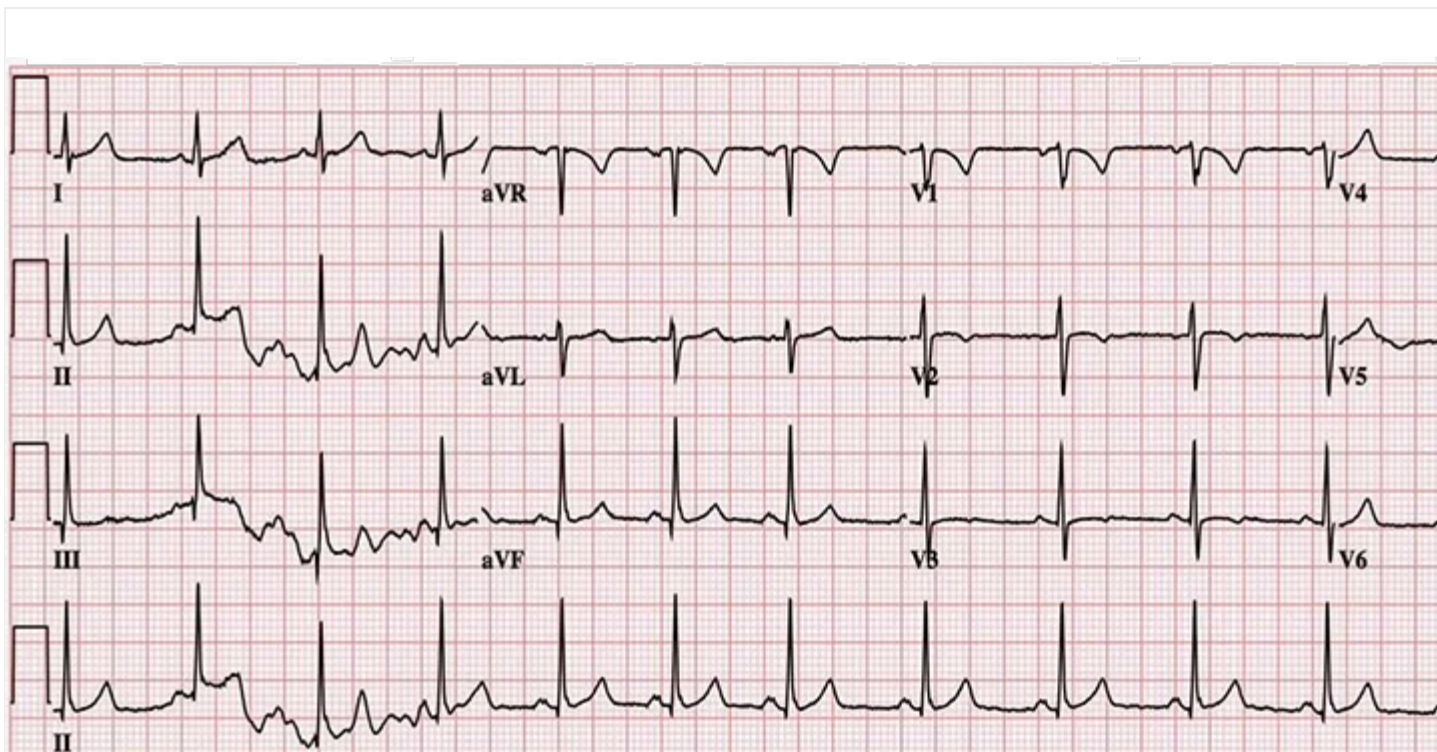
- **Ischemia** in the **anterior leads (V1-V3)**
 - Ischemia also causes inverted T waves
 - These T waves, however, have **dynamics** and will disappear with the resolution of ischemia
- **Arrhythmogenic Right Ventricular Dysplasia (ARVD)**
 - ARVD also causes **inverted T waves (V1-V3) without dynamics**, but ARVD has
 - **Epsilon waves**
 - **Ventricular tachycardias**
 - **Ventricular extrasystoles** with a pattern of **LBBB**



Persistent Juvenile T Waves

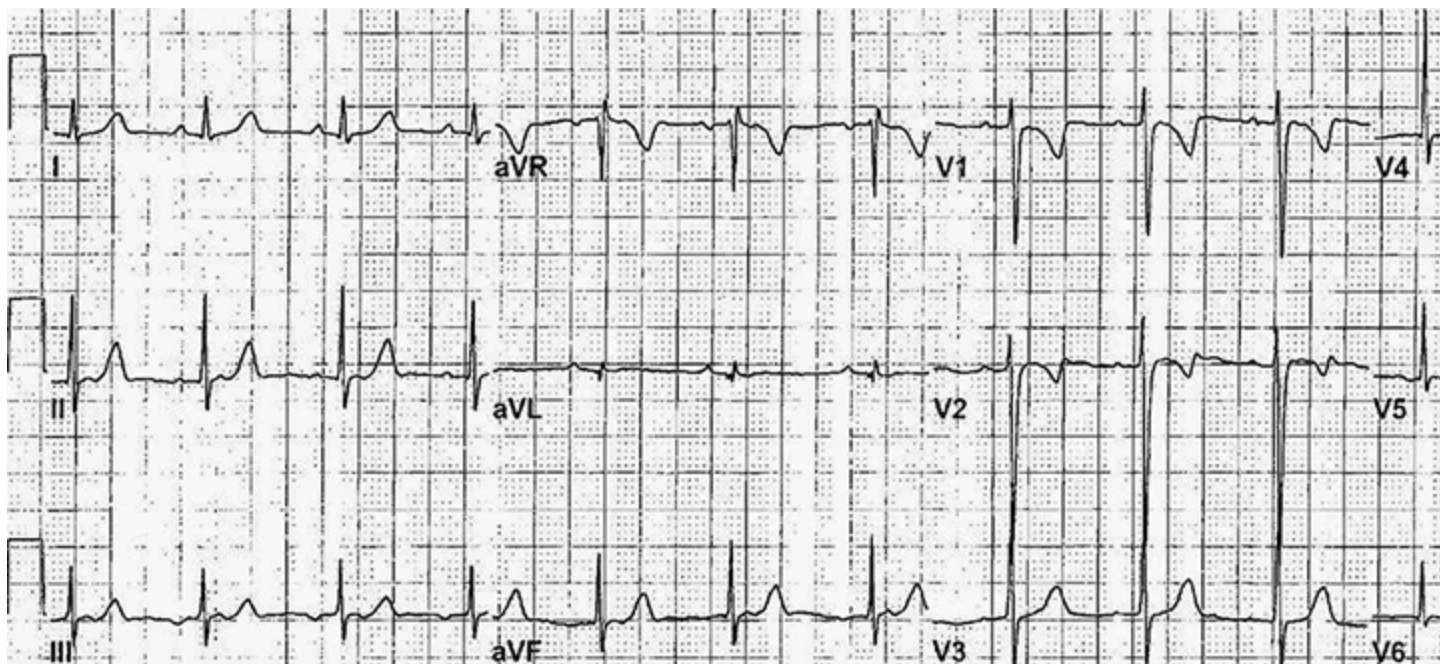
- A **32-year-old** African-American woman **without structural heart disease**
- Had the same T waves (V1-V4) on **EKG 7 years ago**
- **Inverted T waves (V1-V4)**
 - **Depth < 3mm**

- The T waves did not change on repeated EKG recordings (it was not **ischemia**)



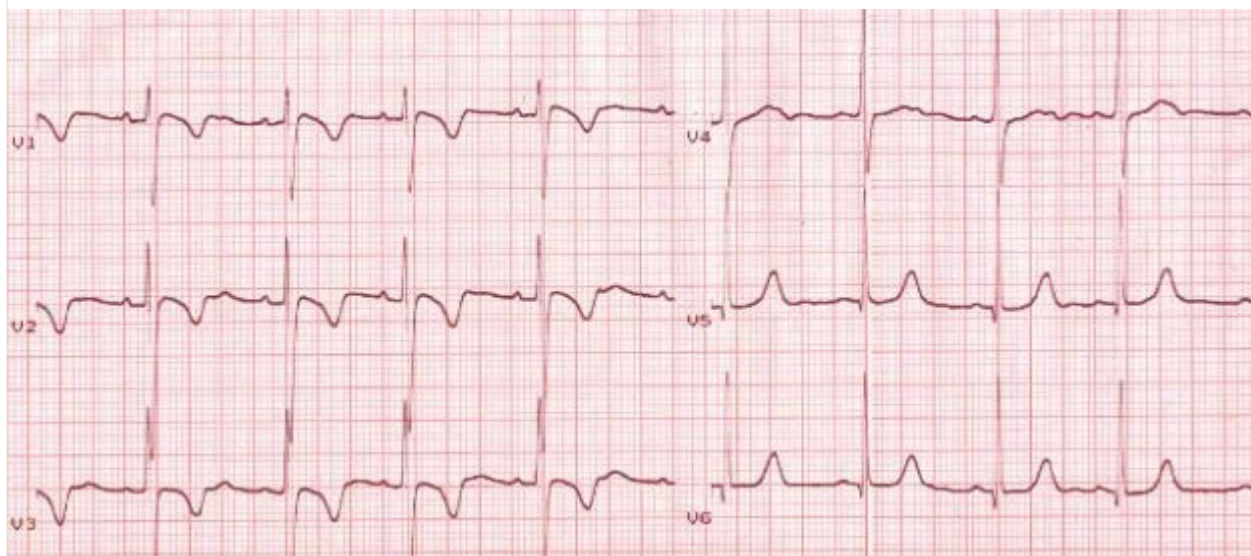
Persistent Juvenile T Waves

- It was a **5-year-old** healthy child **without structural heart disease**
- **Inverted T waves (V1-V2)**
 - **Depth < 3mm**
- **The T waves did not change** in repeated EKG checks



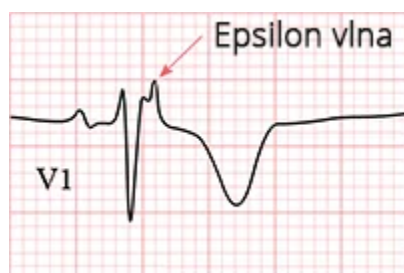
Persistent Juvenile T Waves

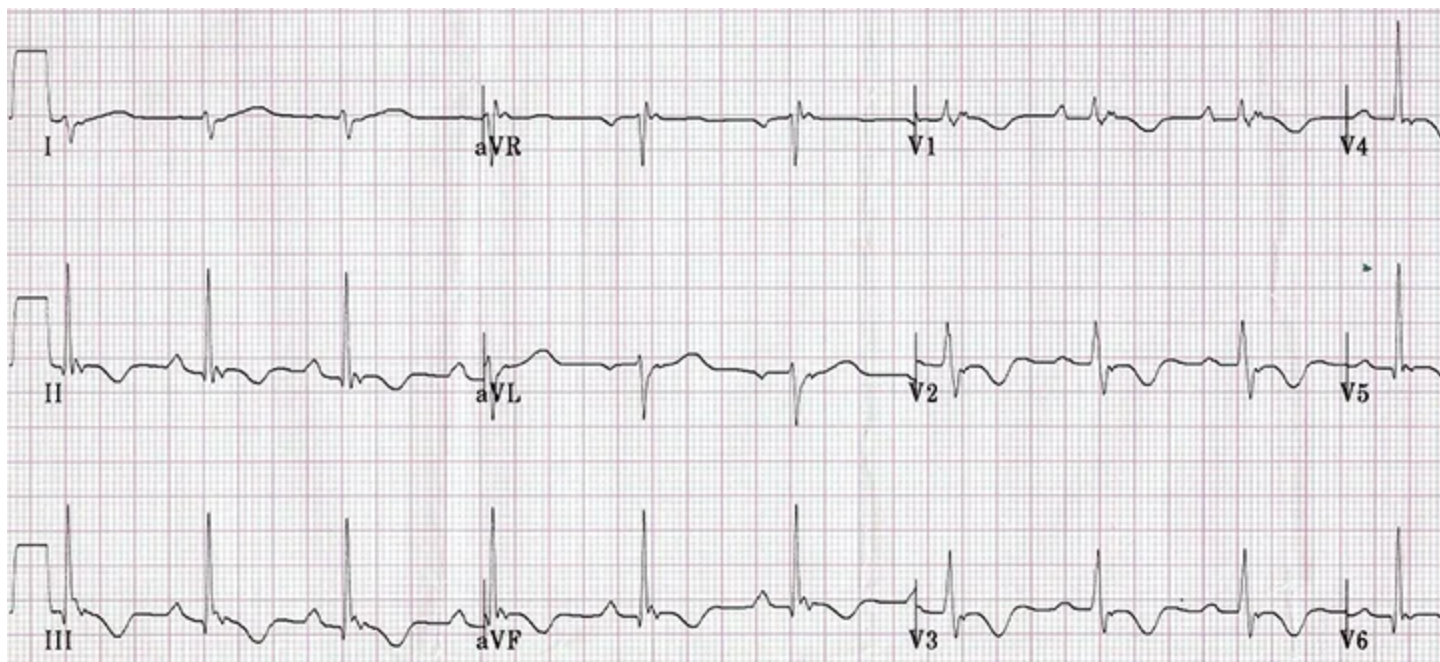
- It was an **11-year-old** healthy child **without structural heart disease**
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Persistent Juvenile T Waves

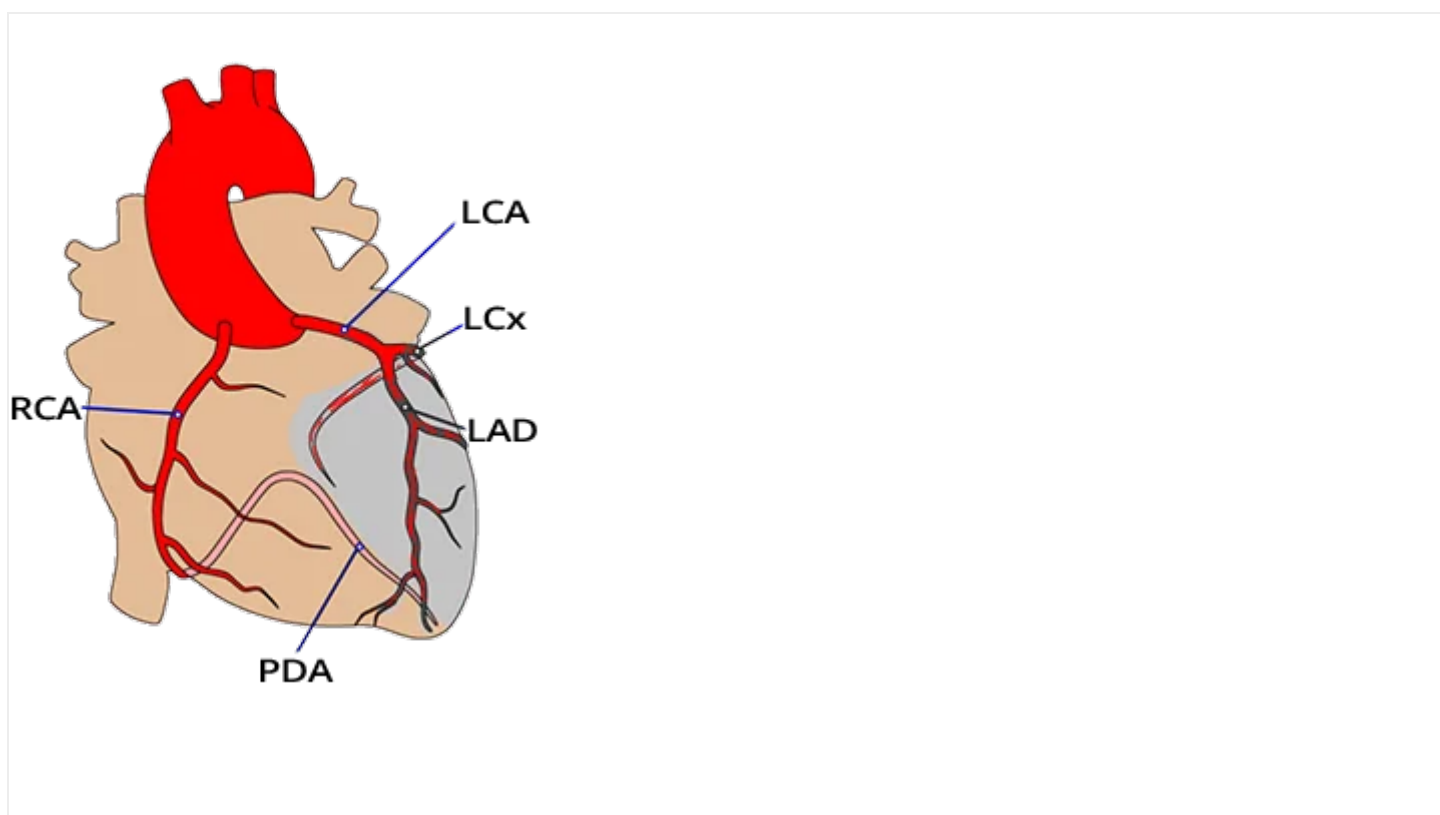
- It was a **20-year-old** healthy woman **without structural heart disease**
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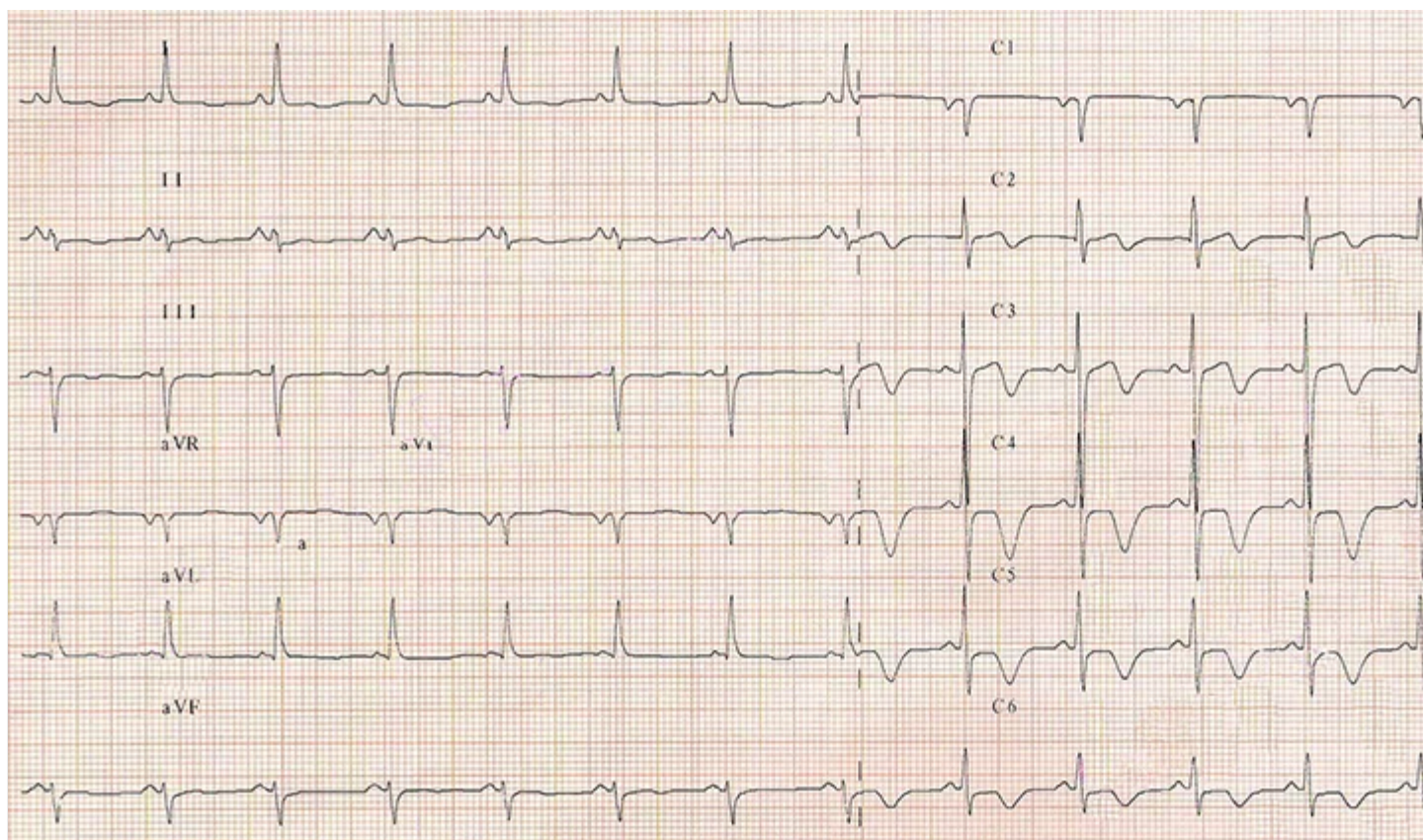




Arrhythmogenic Right Ventricular Dysplasia

- **Epsilon wave** in all leads
 - It is **characteristic of arrhythmogenic right ventricular dysplasia**
- **Negative T waves (V1-V3)**, including V4-6
- **Hypertrophy and overload of the right ventricle**
 - R/S ratio (V1) ≥ 1
 - Descending ST segment and Negative T waves (V1-4) (II, III, aVF)





Inverted Ischemic T Waves and Unstable Angina Pectoris

- The patient had **unstable angina pectoris** due to stenosis of **the LAD and LCx**
 - **ST depression (V4-V6)**
 - **Inverted T waves (V2-V6)**
 - After stent placement (recanalization), the **T waves normalized later**
- For **acute subendocardial ischemia**, **the following are characteristic**
 - **ST depression** and **Inverted T waves** (at least in **2 contiguous leads**)
- Persistent juvenile T waves are only present in leads (V1-V3)

Sources

- ECG From Basics to Essentials Step by Step
- litfl.com
- ecgwaves.com
- metealpaslan.com
- medmastery.com
- uptodate.com
- ecgpedia.org
- wikipedia.org
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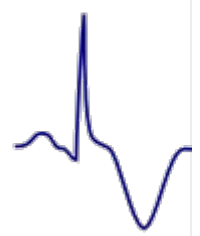
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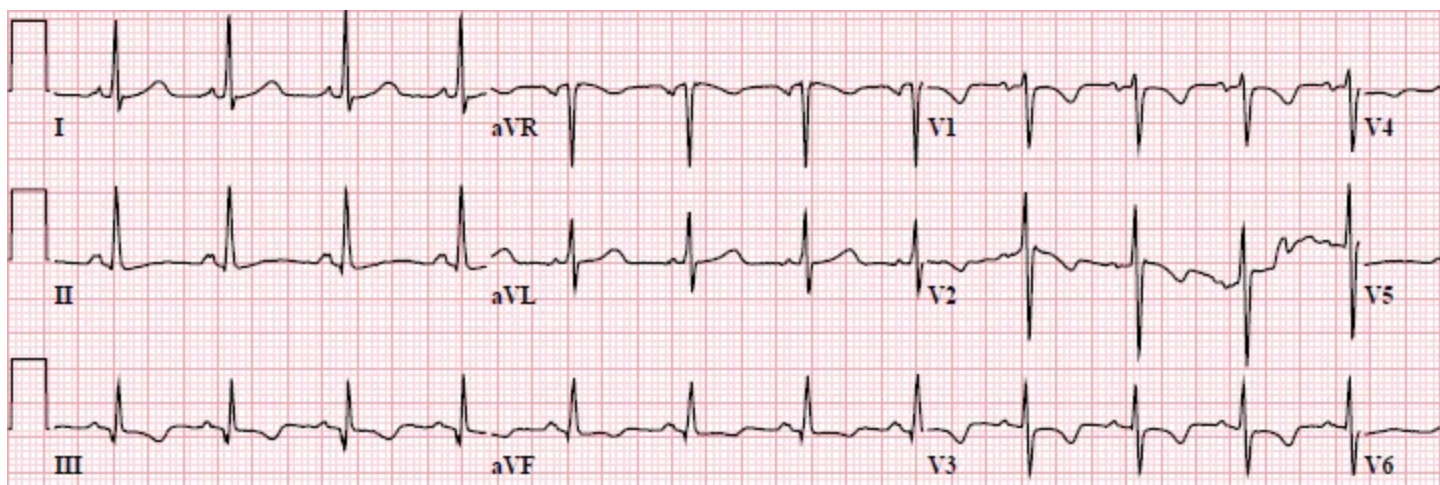
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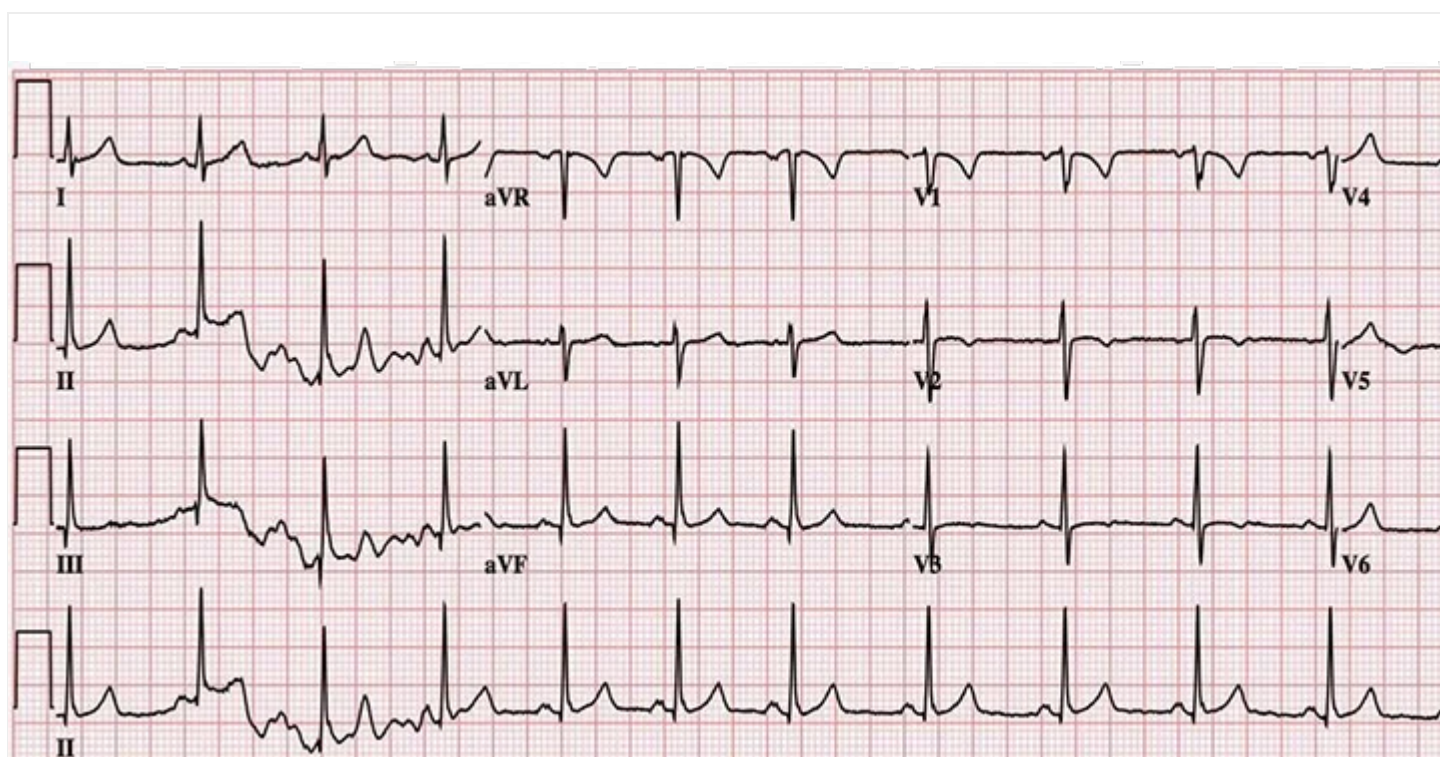
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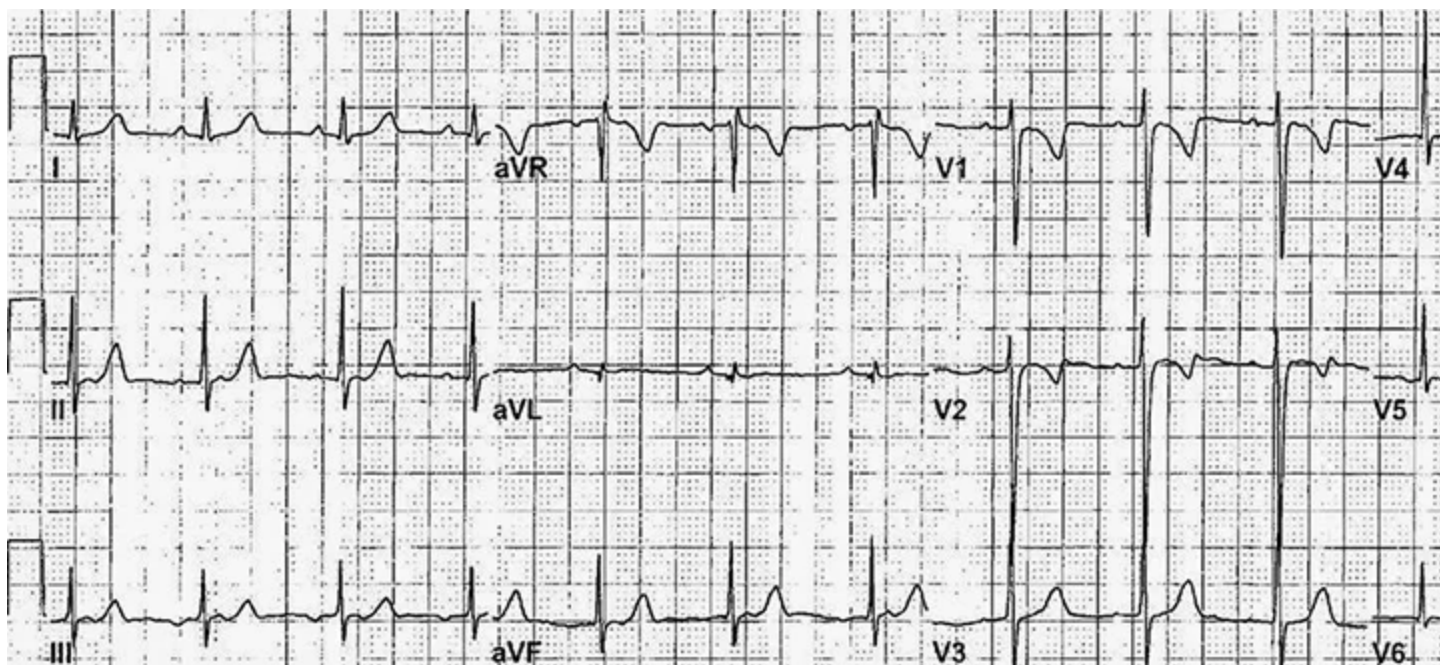
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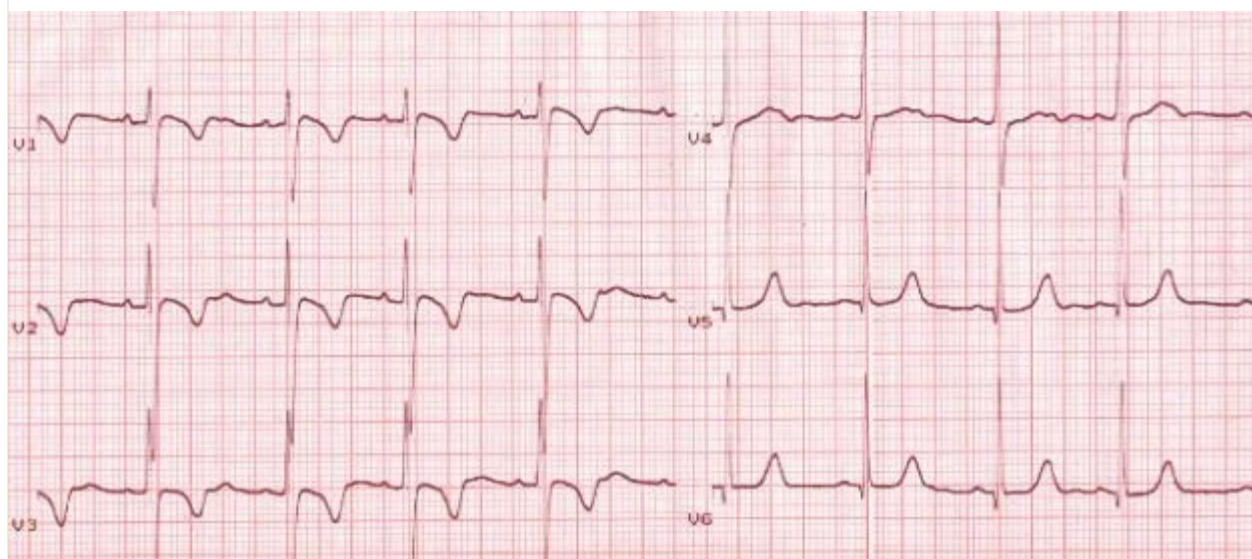
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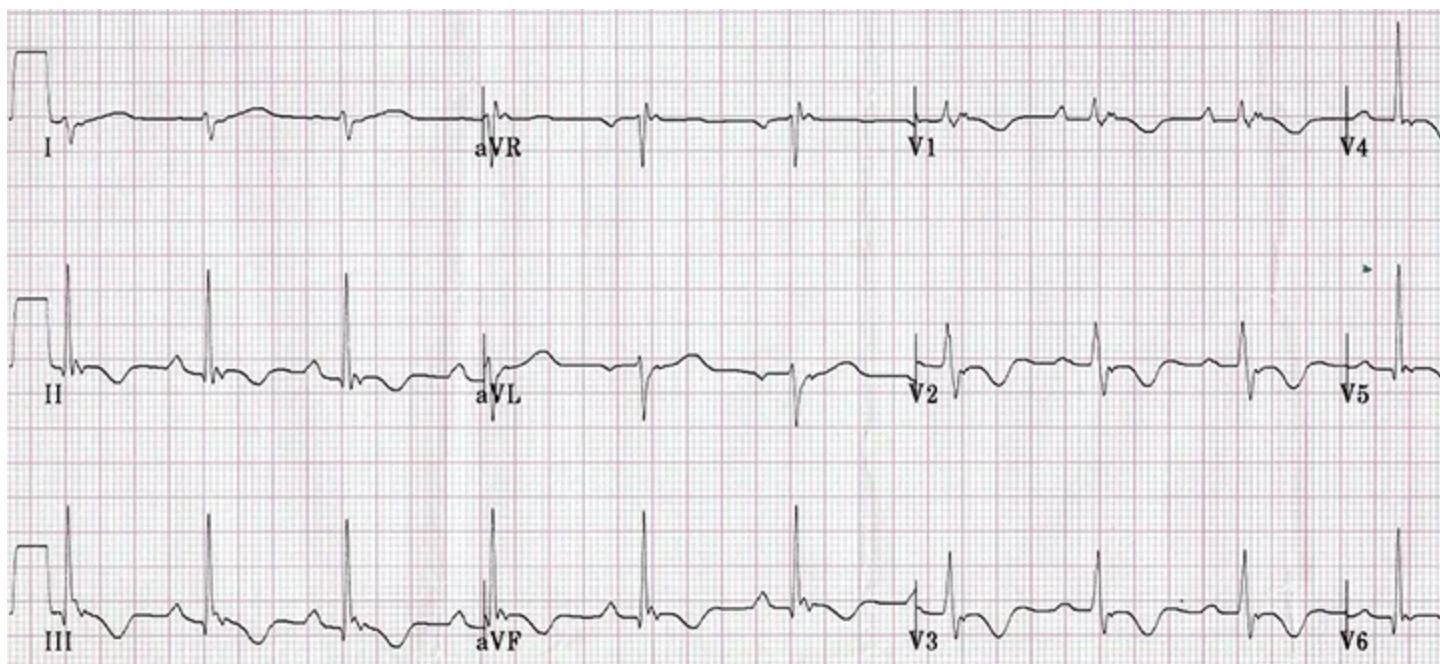
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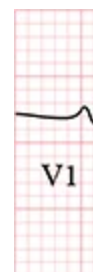
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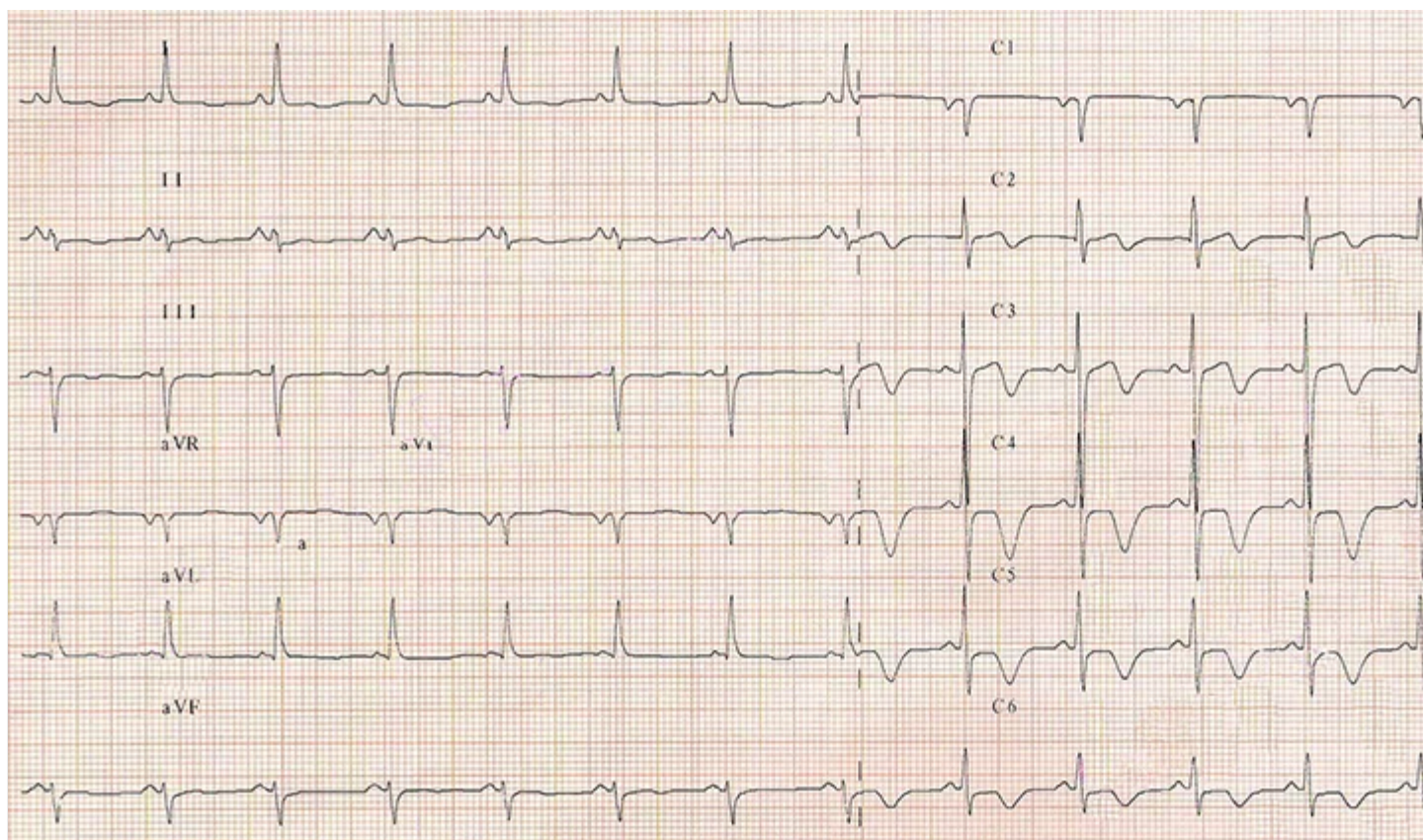
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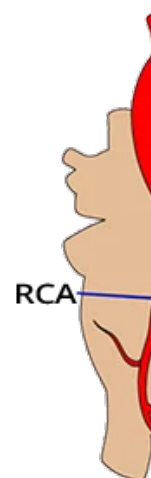
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